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The Frontier Line

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Risk management practices

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The Frontier Line explores a range of investment issues and ideas to explain and illuminate areas for investors to be aware of and be thinking about. Our specialist and sector research teams constantly review and discover topics to provide new perspectives and enrich understanding of critical risks and opportunities.

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Prior to joining Frontier, Michael worked in London for seven years in several trading floor based senior risk management roles. He advised on the risk and performance characteristics of diverse portfolios and investment strategies. He was also involved in regulatory and risk governance related work at a senior level.

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Risk management practices

Lessons that Institutional Investors can learn from the risk management practices at banks and fund managers.

My risk management experience

Prior to joining Frontier in February 2013, I worked for seven years in senior market risk roles on trading floors at several London-based banks. Before that, I was involved in credit risk modelling roles at one of Australia's "Big 4" banks. In those 12 years, I experienced different risk management approaches and cultures at these banks and was fortunate to be directly involved with regulatory-related risk submissions to the UK bank regulator (then called the Financial Services Authority).

My role at Frontier includes research of hedge funds and fixed income fund managers as well as client investment advice. My manager due diligence responsibilities have given me access to the risk approaches of a wide range of fund managers which complements the risk frameworks I've seen at banks.

I believe that there are key lessons that can be learnt by institutional investors from the risk approaches at banks, fund managers and hedge funds. All of these entities cover the spectrum of portfolio complexity, ranging from a relatively simple portfolio of only bonds and equities to complex portfolios with risks across a range of asset classes and strategies. Regardless of the complexity, every one of these investors benefits from risk management. Even the simplest portfolio has a level of interrelationships within the portfolio that can unexpectedly cause large losses; the GFC is testament to that. Risk is important and is key in not only constructing a portfolio of investments, especially those that cover multiple asset classes, but also in understanding how losses can occur. Each investor will have different levels of relevance with respect to the different elements of risk management. However, what is common is that each investor can learn from the strengths of the different risk management approaches. Perhaps most importantly, these investors can also learn how not to repeat the mistakes that have been made at other entities.

This report discusses the various elements of the risk management frameworks of different investors. This includes a mix of qualitative characteristics (e.g. risk culture, roles and responsibilities) and quantitative elements (e.g. risk methodologies, systems, portfolio risk management approach).

Why do banks hold investment portfolios?

To understand what lessons can be learnt from banks, we must first discuss why a bank holds investment portfolios. Unlike institutional investors, banks do not typically manage investors' money in a fiduciary context. Instead, banks will act as an intermediary to facilitate trades between two counterparties and will utilise shareholder capital and leverage to generate a certain rate of return on capital. Banks are varied and consist of a multitude of business areas ranging from the simplest mortgage lending area to a trading floor trading in complex assets whose values are not readily observable. The area of the bank that holds or trades assets that are most similar to those held by institutional investors is the trading area. This area's main purpose is to act as a "middle-man" to facilitate a trade between two counterparties. More often than not, the bank will act as the other counterparty and so will buy assets from a customer wishing to sell an asset or vice versa. In the simplest trade, the bank will just on-sell the asset from the customer to another customer or another bank, thereby earning a spread (i.e. the buy-sell spread) but not taking on any investment risk. More often, though, the bank will hold onto that asset, waiting until it can source a better price or, if it knows it will likely have similar assets from other customers in the pipeline, waiting until it has built up a big enough inventory of this asset to be able to sell a larger volume of the asset at a higher price. Alternatively, the bank may believe that another customer may soon wish to buy the asset the bank has just purchased and so will choose to hold onto this asset until that time.

In all of those instances, the bank is trading in these assets predominantly as a broker and is not doing so to take a view about the market (although it can easily be argued that holding onto an asset longer than one needs to, is effectively the same as taking a market view). Regardless of the reasons for holding onto the assets, the bank will experience profits and losses based on the market movements in these assets. The time horizon for holding onto these assets is usually relatively short; as short as one hour to as long as a week or two but rarely medium-term like an institutional investor.

The types of assets that customers trade with the bank include currencies, interest rates (e.g. interest rate swaps), bonds, equities, commodities and credit (e.g. credit default swaps). The instruments can be fairly vanilla (e.g. currency forward contract) or quite complex (e.g. interest rate derivative). This mix forms a complex portfolio of instruments across asset classes and so, while the intention is different to the portfolios held by institutional investors (i.e. it's not about investment returns but instead operating as a middle-man to facilitate trades for counterparties), similar types of assets are held along with the same complex interrelationships. Given this similarity, the risk discipline that banks operate within could be informative for institutional investors of all shapes and sizes.

Culture

The Institute for Risk Management (IRM) defines risk culture as "a term describing the values, beliefs, knowledge and understanding about risk shared by a group of people with a common purpose, in particular the employees of an organisation or of teams or groups within an organisation." The IRM describes an effective risk culture as "one that enables and rewards individuals and groups for taking the right risks in an informed manner".

This anecdote from an opinion piece in the Financial Times in November 2014 perhaps best encapsulates the issue of poor and ineffective risk culture at some of the major banks prior to the GFC (and perhaps beyond): "Tim Geithner said he realised Merrill Lynch's risk culture was not in great shape when John Thain, then chief executive, did not know the name of his chief risk officer – who at the time was sitting next to him".

The GFC wasn't the only period which saw a breakdown in risk culture. For example, a large loss was suffered by JP Morgan's Treasury area in 2012 when it completely misjudged the risks in its portfolio by assuming that risk mitigation techniques were appropriate. In 2012, the IRM released a paper proposing key elements needed for a firm to have a good risk culture. One case study (sourced from the New York Times) summed up JP Morgan's issues: "In May 2012 JPMorgan Chase disclosed a multi-billion-dollar trading loss on its "synthetic trading portfolio". By its own admission the events that led to the company's losses included inadequate understanding by the traders of the risks they were taking; ineffective challenge of the traders' judgment by risk control functions; weak risk governance and inadequate scrutiny (Dimon, 2012). According to the New York Times, individuals amassing huge trading positions were not effectively challenged, there were regular shouting matches and difficult personality issues."

Part of the issue at JP Morgan was that the risk model output implied that the risks were small. This reflects an issue where the risk management team failed to understand the weaknesses of the models and didn't "think outside the box". A risk team should think beyond the models and not take false comfort in the use of limits and controls to assume that the risks are indeed well managed. The role of limits and controls on traders has been described in the following manner: "Risk models only have value if they are used effectively in combination with a limit management and control process. While a control function requires and relies on reports, the key is not generation of quantitative numbers, formatted in ten different variations and cuts; it is the interpretation and application of that analysis that matters. The objective of a risk function is not just to gather data, run reports, submit and analyse them; it is to ensure that unpleasant surprises and their impacts are limited. While you can't control the timing and magnitude of such surprises, a well-managed and well-run risk function can help manage expectations as well as plan ahead for unexpected shocks."

1. "Models at Work: A Practitioner's Guide to Risk Management", Jawwad Ahmed Farid, 2014

Risk management practices

The IRM believes that there are ten signs of a successful risk culture. Without listing all ten here, there are a few which we believe are important for institutional investors. These include:

- a common acceptance through the organisation of the importance of continuous management of risk, including clear accountability for and ownership of specific risks and risk areas;
- risk management skills and knowledge valued, encouraged and developed, with a properly resourced risk management function and widespread membership of and support for professional bodies. Professional qualifications supported as well as technical training; and
- sufficient diversity of perspectives, values and beliefs to ensure that the status quo is consistently and rigorously challenged.

The views of the IRM marry quite well with what was observed, anecdotally, at banks leading up to and beyond the GFC. Poor risk culture was key at banks and was a big driver of the failings. Generally, there was little respect by traders for risk management including risk management's role, the people and the methodologies. Post GFC though, there was an increased interest in understanding the sensitivity to market stress analysis, risk metrics, and risk limit adherence. This didn't seem to be lip-service but appeared to be a genuine fear of making a loss.

Chief Risk Officers (CROs) reported into the CEO and the Board and some were also heads of risk committees. The power was there but only to persuade, not to make or force changes. Therefore, the only way to effect a portfolio change was to influence a committee and that meant playing an adversarial role to the traders.

However, all too often, traders dominated the discussion and influenced the committees. Despite having power, it came down to whether the right personalities were in place to go "toe-to-toe" with a powerful trader. The type of person needed for this type of challenge role had to have a strong understanding of markets to be able to talk with conviction. They also needed to be the type of person who would think outside the box about the types of unseen scenarios that could cause losses. Not enough people in risk management teams had that type of background.

I've seen a lot of similarities to the poor risk culture at fund managers, with risk management seen as "something to make investors happy" and not often a belief that it adds real value by mitigating risk. There are exceptions of course. Ex-portfolio managers, who have moved from portfolio management roles to risk roles, are the ones that have demonstrated an ability to think beyond compliance checks when performing their roles.

My experience with the risk culture at institutional investors has been quite positive, with the investors' wellbeing at the forefront of decision making. Nonetheless, if not already present, institutional investors could benefit from the inclusion of someone on the Investment Committee (IC) or Board whose remit is to challenge the investment decisions made by the internal investment team, or the asset consultant if the asset consultant has been instrumental in forming these decisions. Indeed, an asset consultant that is hired as an independent party by the IC or the Board may already fulfil this testing and impartial role.

Risk team characteristics

Roles and responsibilities

The number of people in risk management roles at banks can sometimes be as many as the number of risk takers (i.e. portfolio managers or traders). However, this number is appropriate given the varied roles performed across risk management. The roles and responsibilities include trade approvals (i.e. when a trader wishes to execute a trade that would result in a risk limit being breached), portfolio risk analysis, risk limit setting, risk limit checking, risk limit breach approval, scenario generation, risk reporting and regulatory-related work. In addition, risk managers provide risk advice to traders, trading floor heads (the equivalent of a CIO), the CRO and several levels of committees. These types of roles are consistent across most banks.

Risk limit setting involves creating a level of risk that a trader is not allowed to exceed. There is a wide range of risks that are subjected to limits, with the breadth consistent with the complexity of the portfolio. For example, a multi-asset class portfolio will have limits applied to the amount of nominal for an equity index, the maximum duration allowed for bonds, the maximum size of a currency exposure against the US dollar or the maximum amount of a commodity that is allowed to be held. In addition, limits are also applied to Value at Risk (VaR), stress tests and scenario results.

Limit setting is performed by the risk management team and not by the traders. This is an important dynamic whereby the Board at a bank has set a level of risk appetite that is delegated to the Risk Committee, which in turn delegates this to the head of the trading floor.

At some banks, the CRO has delegated authority to force a trader to reduce their risk levels even if these are not breaching any pre-defined risk limit.

At fund managers, the portfolio managers and/or CIO usually set the risk limits. These fund managers mostly have smaller risk teams that are usually compliance in nature. For the fund managers with straight forward portfolios, most risk teams are there to check that portfolio risk is within pre-defined limits and not to advise the portfolio managers of an unexpected build-up of unwanted risks in the portfolio.

At fund managers with more complex investment approaches, the evidence is mixed. Some risk managers are ex-portfolio managers, have a certain level of delegated authority and operate in a similar manner to banks. The key role served by these more complex risk managers is to influence the risk -takers and other people directly impacted by the fund's performance (e.g. CIO or founders). These risk managers see themselves as helping portfolio managers (and the fund's CIO and founders) to take the right type of risks and not just as a reporting/ compliance function. Some risk teams, though, are similar to those used by managers with less complexity and are there just to check that the portfolio's risk is within pre-defined limits.

The size of an investment risk management team, and its commensurate roles and responsibilities, at an institutional investor depends on the portfolio and should be fit for purpose. There may not be a need for limit setting or compliance checks but there should be a team adopting the role of challenging the person or team making the investment decisions.

Risk management practices

Accountabilities

A key difference between banks and fund managers is accountability. Banks are accountable to shareholders, with a reporting line for the CRO directly through to the CEO or even the Board to demonstrate true independence.

Fund managers, though, will usually have the risk managers reporting through to the founders, CIOs, CEOs or even the Chief Operating Officers; it is clearly a different level of authority. Some managers trumpet the virtue that their risk management team is explicitly there to protect the interests of investors, which is true when viewed only from the perspective of a compliance check. This team checks that a portfolio manager is keeping the portfolio's risk levels within pre-agreed risk constraints (e.g. VaR, volatility, leverage).

While this is clearly an important role, we would like to see more evidence of risk managers going above and beyond in this compliance role and providing risk-mitigating advice to a portfolio manager that resulted in portfolio changes.

Risk managers at institutional investors are usually accountable to the investors (e.g. members in the case of superannuation funds). This role, though, is usually more compliance in nature and not focused on investment risk management. Consequently, a head of risk management (more like a head of compliance) does not report into a CIO but usually the CFO or CEO. That demonstrates a level of independence from the investment decision makers, although the reduced focus on investment risk and possible lack of investment risk reporting to an investment committee means that members' interests may not be protected to the level that they could be.

Risk appetite and delegated authorities

Risk appetite

Risk appetite is the amount of risk that an entity is comfortable taking in a portfolio given the uncertain future scenarios that could lead to losses. Risk appetite needs to be quantified and risks defined to have any meaningful impact on the ability to manage the portfolio's risks. In most institutional investors' portfolios, risk is proxied by volatility and so the risk appetite is usually expressed in terms of this metric. Volatility is a weak metric to use for this because an investor's risk appetite focuses more on large market falls, as opposed to the variability in monthly portfolio returns in normal markets (this is essentially what volatility measures). To take account of volatility's weakness as a risk-appetite proxy, an investor needs to take into account downside losses. For example, the APRA mandated Standard Risk Measure (SRM), which calculates the expected number of negative returns over a 20-year period, is one measure which helps to frame an investor's risk appetite. The SRM is a positive step to reflect what perhaps matters most to investors (i.e. avoidance of negative returns) but has some limitations since it doesn't take into account how large those negative returns may be. A risk-measure which does take the magnitude of the loss into account is VaR, which measures the expected size of a loss on rare occasions (e.g. once every hundred years). This measure has been criticised heavily in recent years and, perhaps, rightly so. Perhaps the most succinct criticism is by Sam Riley from CheckRisk who said that "Value-at-risk is a very dangerous tool and using it is like driving down the highway very fast looking into your rear view mirror. You will have an accident, it is just how badly and when."

The principle of the measure is not necessarily weak but the method used to calculate it is where the issues lie. We will not go into detail here about the different methodologies that can be adopted but, suffice to say, each model has its strengths and weaknesses. Risk appetite can be expanded by complementing the weaknesses that exist in VaR by using stress tests and scenario analyses. These measures attempt to highlight losses that could occur under different historical and hypothetical scenarios. It is then up to the entity to decide how comfortable it is with different loss levels and take steps to limit these losses accordingly.

Fund managers will specify risk targets for the portfolio so that investors are aware of the risk profile of the product. This risk metric is usually volatility but some state the VaR target. It should be noted though that for most products, the VaR calculation is simply a multiple of the volatility measure and so does not solve the issue of using large losses to help proxy risk appetite. Most risk appetite measures are targets and not limits, which means that realised experience may be higher than the targeted level. However, one key difference to banks is that products offered by managers cannot readily change the risk appetite if it has been specified in the prospectus. Unlike a bank, which may allow traders to start taking on more risk if conditions permit, a fund manager cannot increase its risk tolerance but must remain consistent with the risk tolerance pre-specified for the product. There is, of course, wriggle-room given that risk tolerances are usually targets and not set in stone.

Institutional investors mainly focus on volatility, the probability of achieving a CPI plus target and now the Standard Risk Measure as the metrics for proxying risk appetite. Institutional investors could benefit from using other downside risk metrics such as VaR or stress scenarios as a way to express their loss tolerance; being mindful of the limitations of relying on any single approach.

Delegated authorities

Bank risk committees take a much more hands-off role to scrutinising the portfolio. The authority for structuring a portfolio (e.g. analogous to setting asset allocations in an institutional investor's portfolio) is delegated to the traders who are given the risk limits within which they must operate and are left to structure their portfolios accordingly. The better committees, with input from risk management, may question specific risk levels even if risk limits have not been breached. This is a prudent course of action reflecting that not all risks in a portfolio can be subjected to a limit.

The types of delegations that exist at a fund manager are varied and depend on the fund manager, whether there is one product or multiple products offered by the manager, whether the CIO is also a portfolio manager for a product or simply a thought leader for other portfolios and whether the Investment Committee exists to generate investment themes that must be included in any portfolio run by the firm or if it is there to scrutinise the portfolios' risk and return profiles.

As an example, consider a manager which has a number of products run by different portfolio managers and which has an IC that hands down the investment themes that must be adhered to by the portfolio managers.

This type of IC delegates the operation of each portfolio within pre-agreed risk guidelines (e.g. VaR, scenarios) but retains control for what types of investment themes should be in the portfolio. Another manager may have a similar arrangement whereby the IC will specify the risk tolerances for the portfolios but delegate the investment theme creation to the portfolio managers, thereby giving more freedom to the portfolio managers in how they structure the portfolio to achieve a desired risk/return outcome.

The role of delegations at institutional investors depends on the complexity of the portfolio and the level of capability within an internal investment team. ICs are more hands-on than their bank equivalents and retain portfolio construction decisions by being responsible for strategic and dynamic asset allocation decisions. Other ICs retain manager selection decisions with a shortlist of managers proposed by the internal team and asset consultant. Our view is that the IC's delegations should be fit-for-purpose and ensure that decision making authority resides with the people most capable to make those decisions.

Risk methodologies

The risk methodologies adopted by these investors are varied. The level of complexity is usually commensurate with the portfolio's complexity. For example, banks utilise advanced risk models to predict the types of losses that the bank could suffer in a range of scenarios. A bank's portfolio will include trades across all asset classes (e.g. equities, commodities, interest rates). The trades themselves range from the simple to the extremely complex, whereby the price of these complex trades can only be calculated using in-house built pricing models since there is no observable price in the market.

The risk analytics used by the banks and which have now been adopted by most fund managers (where applicable) include standard metrics such as VaR, stress tests, scenario analysis and risk factor sensitivities. In addition to these, banks also use reverse stress tests, which involve determining what type of market moves would lead to a certain loss.

The metrics used by fixed interest managers include duration analysis but not much emphasis on interest rate sensitivities across the term structure that would highlight exposure to non-parallel moves in yield curves. VaR is used but the calculation methodology is fairly simple and inadequate for any managers that utilise options; and it would surprise just how many use these types of non-simple trade types in their portfolios.

Most have historical stress tests or scenarios. Where applicable, option risk sensitivities are analysed but not as vigorously as they perhaps should be; options are complex instruments and unexpected losses can arise if these sensitivities are not well understood.

For hedge funds, the level of complexity of the risk models depends on the hedge fund strategy (e.g. relative-value fixed interest, global macro). Usually, these are more advanced than their fixed-interest counterparts. I've observed more in-depth analysis of correlation conditions and more active scenario generation at hedge fund managers.

The less liquid managers (e.g. opportunistic credit) tailor risk analysis to their strategy but are not as advanced as they perhaps should be. One manager was quite candid with his criticisms of VaR and chose to use a more simplistic approach to understanding the risks in his portfolio.

The portfolios for institutional investors may be less complex than those for banks and some fund managers but the existence of a number of moving parts, given the different asset classes within the portfolios, means that an understanding of the diversification breakdowns that could occur in a market stress scenario is vital. At a minimum, this type of portfolio should use VaR but, given the limitations of this methodology, it should also be complemented by scenarios and stress tests. The complexity of these calculations should be commensurate with the complexity of the portfolio.

Risk systems

As with methodologies, the systems adopted by banks and fund managers are usually reflective of their portfolios' complexity. The systems range from the simple to the most advanced. Advanced systems include either in-house built risk systems that are specially coded to handle difficult-to-value trades or purchased software that has been modified to suit the bank's complex trades. The less advanced banks will usually have an off-the-shelf purchased system, which is likely a minimum requirement for any bank that seeks accreditation from the local regulator to use its risk methodology to calculate market risk capital that must be set aside to cover a certain level of losses for the bank's portfolio.

Fund managers have improved on the risk systems front over the past few years. Most use some type of off-the-shelf system by well-known vendors such as BlackRock or Barra. Some of the more advanced managers (e.g. global macro hedge funds) have built their own risk systems.

At the simpler end of the complexity spectrum are managers that use Microsoft Excel to calculate standard risk metrics, if at all. In some cases, this is appropriate for the strategies that these managers run. In other cases, though, we view these as inadequate.

For institutional investors, "fit-for-purpose" should be a driving principle when deciding how advanced a risk system needs to be. Using asset allocations at the asset class level is likely appropriate enough and, if so, then a relatively simple system (e.g. Microsoft Excel) could be adopted. The more advanced systems are relatively expensive but the granularity of information may be warranted given the use of external managers introduces a level of opacity not present at fund managers and banks who predominantly execute their own trades. Having this level of granularity helps to identify risk concentrations at the manager level as well as sector or geographical risk concentrations not otherwise apparent.

Portfolio risk management

Diversification

Banks will mostly diversify the portfolio at a risk factor level, although this should not be confused with non-traditional beta factors. Instead, risk analysis is based on market factors such as yield curve, credit spreads, currency, or equity index and dividend yield curve.

Funds, on the other hand, will mostly analyse risk at the asset class beta level (e.g. equity beta) except for alternative beta-type managers which will diversify across these betas.

Institutional investors can have varying portfolio types although most are fairly diversified across a range of asset classes and liquidity (e.g. property or infrastructure).

Frequency of portfolio changes

Banks make changes on an hourly or daily basis. Traders are rarely given the chance to hold medium-term investment themes. This is due to the timeframe for the risk limits which are as short as one day to as long as ten days. In addition, stop-loss frameworks are usually triggered in tight ranges thereby necessitating shorter-term portfolio changes.

Fund managers though are quite mixed, even within the same portfolio. Some can be short term but most are medium-term (i.e. over a few months). This ability to take medium-term views and not make many portfolio changes is due to investors essentially licensing the portfolio managers to hold through short-term volatility.

Institutional investors will usually have a longer investment time horizon and will structure the portfolios according to strategic asset allocations (SAAs).

Some investors take current valuations and market conditions into account and will adopt annual reviews of these SAAs or more frequent changes to asset allocations using a Dynamic Asset Allocation framework.

Tail risk hedging

The hedging by banks of tail risks in the portfolio will usually be the responsibility of the head of the trading floor with input by risk management. However, the process is not as complex or advanced as would be expected. The specific hedges may be relatively opportunistic in nature and may not be a continuous programme.

Fund managers have started adopting tail risk hedging in some form, with managers explaining that the GFC changed their perspective. There is now a real appreciation of the benefits of including some hedges within the portfolio to protect it against large market moves. Tail risk hedging is now viewed as a way to ensure the manager does not suffer a sufficiently large loss that would result in a wave of redemptions that would put the business at risk. The complexity of the hedges in place ranges from very simplistic to quite targeted and advanced. Even idiosyncratic strategies have started utilising tail risk hedges given an observed and/or predicted correlation to equity falls in severe stresses.

I've noted an increasing willingness with institutional investors to consider the merits of tail risk hedging. At the very least, there is an acknowledgement that equity-dominated portfolios need a counter-balance during periods of market stresses and understand that tail risk hedging is one such strategy that offers this offset. Some investors that we deal with have implemented tail risk hedging programs or are seriously considering this approach.

Conclusion

This paper has discussed a wide range of risk management characteristics that have been observed at banks and fund managers, providing information for institutional investors contemplating changes that could be made to improve their own risk management. Institutional investors range in complexity and so the choices to be made about risk management need to reflect the complexity of the fund. The information provided here allows the institutional investor to benchmark itself based on the complexity of its arrangements.

For example, simpler risk methodologies may be suitable for funds with few moving parts. Alternatively, the risk appetite section may be valuable for an investor with a large internal team with investment undertaken in -house; this type of investor may have a similar setup to a bank and so may choose to benchmark itself accordingly.

What is universal though across all investors is the discussion about culture. Ensuring the right types of risks are taken is key for any type of portfolio. While the poor culture seen at some banks may seem like an extreme example, the reality is that any investor without someone challenging the actions being taken, exposes itself to the risk of large losses either through poor selection of risks or poor understanding of the risks being taken.

FRONTIER ADVISORS

About Frontier Advisors: Frontier Advisors is one of Australia's leading asset consultants. We offer a range of services and solutions to some of the nation's largest institutional investors including superannuation funds, charities, government / sovereign wealth funds and universities. Our services range from asset allocation and portfolio configuration advice, through to fund manager research and rating, investment auditing and assurance, quantitative modelling and analysis and general investment consulting advice. With around $242 billion in funds under advice we have been providing investment advice to clients since 1994. Our advice is fully independent of product, manager, or broker conflicts which means our focus is firmly on tailoring optimal solutions and opportunities for our clients.

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